

**Iowa Department of Natural Resources
Environmental Protection Commission**

ITEM

18

INFORMATION

TOPIC

**Proposed Rule – Amendments to Chapter 135, Technical Standards and
Corrective Action Requirements for Owners and Operators of
Underground Storage Tanks**

The Department proposes amendments to revise the current Tier 2 software model, the evaluation of public water supply wells, and implementation of corrective action at high risk leaking underground storage tank sites.

Based on observations during the first decade's use of the existing model, there was a perception that the length of contaminant plumes generated by the model, in many cases, significantly over-estimated the extent of contaminant migration. Changes were made to recalibrate the Tier 2 software model to make the modeled groundwater plumes more closely match the actual groundwater plumes.

The last decade of experience also showed that the Tier 2 software model, which is a two dimensional fate and transport model, was not always sufficiently predictive of risk to pumping wells. Of particular concern are public water supply wells which may have a large radius of influence caused by their greater water withdrawal rates. In order to better assess the risk to these public water supply wells, the amendments establish additional criteria for their risk evaluation.

As a result of a business process improvement event held by the department in 2004, a modified approach to processing and planning activities for high risk LUST sites was implemented. The proposed rules incorporate these changes in the processing of high risk sites.

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October, 2007

ENVIRONMENTAL PROTECTION COMMISSION[567]

Notice of Intended Action For Information

Pursuant to the authority of Iowa Code section 455B.474, the Environmental Protection Commission proposes to amend Chapter 135, “Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks,” Iowa Administrative Code.

The amendments propose to revise the current Tier 2 software model based on observations during the first decade of use. There was a perception that the length of plumes generated by the Tier 2 groundwater model may significantly over-estimate the length of actual groundwater contamination plumes. Changes were made to recalibrate the Tier 2 software model to make the modeled groundwater plumes more closely match the actual groundwater plumes.

The last decade of experience also showed that the Tier 2 software model, which is a two dimensional fate and transport model, was not always sufficiently predictive of risk to pumping wells particularly public water supply wells. Public water supply wells may have a larger radius of influence caused by their greater water withdrawal rates. In order to better assess the risk to these public water supply wells, the amendments establish a more stringent criteria for their risk evaluation. This includes sampling of the public water supply wells for indicator contaminants if the well is within 1000 feet of the site or if the site is located within a documented capture zone or radius of influence for a public water supply well. The purpose of testing for the indicator contaminants is to evaluate if there is a hydraulic connection between the shallow/contaminated aquifer and public water supply wells. In addition, public water supply wells will be evaluated with a Tier 3 assessment. For non- public water supply wells, the amendments require sampling of water wells as part of the receptor survey and their evaluation.

The amendments also establish a procedure to implement corrective action at high risk sites either through a collaborative meeting process resulting in a memorandum of agreement between the interested parties and the department or submittal of a corrective action design report.

Three public hearings will be held at the following locations:

Iowa City Public Library

123 S Linn Street
Iowa City, Iowa

Community Meeting Room
Denison City Hall Clerk's Office
111 N Main St
Denison, Iowa

Wallace State Office Building
502 East Ninth Street
Des Moines, Iowa

These amendments are intended to implement Iowa Code section 455B.474. A fiscal impact summary prepared by the Legislative Services Agency pursuant to Iowa Code § 17A.4(3) will be available at <http://www.legis.state.ia.us/IAC.html> or at (515) 281-5279 prior to the Administrative Rules Review Committee's review of this rule making.

The following amendments are proposed.

ITEM 1. Amend 567—135.2(455B) by adding following definitions:

“Corrective action meeting” A collaborative meeting for high risk sites between all interested parties to select a corrective action or reclassification activity and set a schedule for implementation. Upon resolution of the corrective action meeting, the responsible party will all sign a memorandum of agreement with the department outlining the activities that will take place and when they will occur.

“Indicator contaminants” means oxygenated compounds, methyl-tertiary butyl ether (MTBE), tertiary-butyl alcohol (TBA), ethyl-tertiary butyl ether (ETBE), and tertiary-amyl methyl ether (TAME) and lead scavengers 1,2-dichloroethane (1,2-DCA) and ethylene dibromide (EDB), or other compounds specified by the department as critical in the assessment of risk to the site.

“Public water supply system” means a system for the provision to the public of piped water for human consumption, if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days out of the year. The term includes (1) any collection, treatment, storage, and distribution facilities under control of the supplier of water and used primarily in connection with the system, and (2) any collection (including wells) or pretreatment storage facilities not under the control which are used primarily in connection with the system.

ITEM 2. Amend paragraphs 135.10(4)“a”, “b” and “f” as follows:

a. Pathway completeness. Unless cleared at Tier 1, this pathway is complete and must be evaluated under any of the following conditions: (1) the first encountered groundwater is a protected groundwater source; or (2) there is a drinking water well or a non-drinking water well within the modeled groundwater plume or the actual plume as provided in 135.10(2)“j” and 135.10(2)“k”; or (3) there is a drinking water well or a non-drinking water well within 1000 feet of the site.

b. Receptor evaluation. At a minimum, all drinking water and non-drinking water wells located within 1000 feet of the site must be identified. If a public water supply well is located within 1000 feet of the site or if the site is located within a designated capture zone or radius of influence for a public water supply well as projected or as otherwise documented by the department, it must be tested for chemicals of concern, indicator contaminants, or other compounds which may be required by the department. All other drinking or non-drinking water wells located within 300 feet of the site (or within an actual or modeled plume) must be tested, at a minimum, for chemicals of concern and MTBE as part of the receptor evaluation.

If a public water supply well is located within 1000 feet of the site or if the site is located within a designated capture zone or radius of influence for a public water supply well as projected or as otherwise documented by the department, it must be evaluated and a risk classification assigned with a Tier 3 assessment. Prior to conducting a Tier 3 assessment, a groundwater professional must submit a Tier 3 work plan to the department for approval in accordance with 135.10(4)e. All other existing drinking water wells and non-drinking water wells within the modeled plume or the actual plume as provided in paragraph “a” must be

evaluated as actual receptors. Potential receptors only exist if the groundwater is a protected groundwater source. Potential receptor points of exposure are those points within the modeled plume or actual plume that exceed the potential point of exposure target level. The point(s) of compliance for actual receptor(s) is the receptor. The point(s) of compliance for potential receptor(s) is the potential receptor point of exposure as provided in 135.10(2)“j” and 135.10(2)“k.”

f. Plume definition. The groundwater plume shall be defined to the applicable Tier 1 level for actual receptors except, where there are no actual receptors and the groundwater is a protected groundwater source, the plume shall be defined to the Tier 1 level for potential receptors. Groundwater from identified well receptors shall be sampled and analyzed in accordance with 135.10 (4) b.

ITEM 3 Amend paragraphs 135.10 (11) “a” and “d” as follows:

a. Owners and operators must submit a Tier 2 site cleanup report and a Tier 3 work plan for the public water supply wells within 180 days of the date the department approves or is deemed to approve a Tier 1 assessment report under 135.9(12). If the owner or operator has elected to conduct a Tier 2 assessment instead of a Tier 1, or a Tier 2 assessment is required due to the presence of free product under 135.7(5), the Tier 2 site cleanup report and the Tier 3 work plan for the public water supply wells must be submitted within 180 days of the date the release was confirmed. The department may establish an alternative schedule for submittal.

d. Review. Unless the report proposes to classify the site as low risk or no action required, the department must approve the report within 60 days for purposes of completeness or disapprove the report upon a finding of incompleteness, inaccuracy or noncompliance with these rules. If no decision is made within this 60-day period, the report is deemed to be approved for purposes of completeness. The department retains the authority to review the report at any time a no action required site classification is proposed.

ITEM 4 Amend paragraphs 135.12 (3) “d” and “e” as follows:

d. A corrective action design report (CADR) must be submitted by a certified groundwater professional for all high risk sites unless the terms of a corrective action plan are formalized in a memorandum of agreement within a reasonable time frame specified by the department. The

CADR must be submitted on a form provided by the department and in accordance with department CADR guidance within 60 days of site classification approval as provided in 135.10(11). The CADR must identify at least two principally applicable corrective action options designed to meet the objectives in 135.12(3), an outline of the projected timetable and critical performance benchmarks, a specific monitoring proposal designed to verify its effectiveness and provide sufficient supporting documentation consistent with industry standards that the technology is effective to accomplish site-specific objectives. The CADR must contain an analysis of its cost effectiveness in relation to other options. The department will review the CADR in accordance with 135.12(9).

e. Interim monitoring. From the time a Tier 2 site cleanup report is submitted and until the department determines a site is classified as no action required, interim monitoring is required at least annually for all sites classified as high risk. Groundwater samples must be taken: (1) from a monitoring well at the maximum source concentration; (2) a transition well meaning a monitoring well with detected levels of contamination closest to the leading edge of the groundwater plume as defined to the pathway-specific target level, and between the source(s) and the point(s) of exposure; and (3) a guard well meaning a monitoring well between the source(s) and the point(s) of exposure with concentrations below the SSTL line. If concentrations at the point of exposure already exceed the SSTL, the point of exposure must be monitored. Monitoring conducted as part of remediation or as a condition of establishing a no action required classification may be used to the extent it meets this criteria. Soil monitoring is required at least annually for all applicable pathways in accordance with 135.12(5)“d.”. All existing plastic water lines, drinking water wells and non-drinking water wells within 100 feet of the largest actual plume (defined to the appropriate target level for the receptor type) must be tested annually for chemicals of concern. Actual plumes refer to groundwater plumes for all chemicals of concern. Untreated, or raw water should be collected for analysis.

ITEM 5 Amend paragraphs 135.12 (9) “a” and “d” as follows:

a. Owners and operators must participate in a corrective action meeting and enter into a memorandum of agreement with the department or if otherwise specified, a corrective action design report (CADR) or a Tier 3 report may be submitted or expedited corrective action performed. In the event the department has accepted submittal of the CADR in lieu of the

meeting, a CADR shall be submitted ~~submit a corrective action design report (CADR)~~ within 60 days of the date the department approves or is deemed to approve a Tier 2 assessment report under 135.10(11) or a Tier 3 assessment is to be conducted. The department may establish an alternative schedule for submittal. Owners and operators who fail to timely submit a CADR or enter into a memorandum of agreement may be subject to legal action.

d. Review. Unless the report proposes to classify the site as no action required, the department must approve the report within 60 days for purposes of completeness or disapprove the report upon a finding of incompleteness, inaccuracy or noncompliance with these rules. If no decision is made within this 60-day period, the report is deemed to be approved for purposes of completeness. The department retains the authority to review the report at any time a no action required site classification is proposed. Owners and operators who fail to implement actions or meet the activity schedule in a memorandum of agreement resulting from a corrective action meeting or who fail to implement the actions or schedule outlined in an approved CADR are subject to legal action.

ITEM 6 Amend Appendix B as follows:

Appendix B - Tier 2 Equations and Parameter Values

All Tier 1 equations and parameters apply at Tier 2 except as specified below.

Equation for Tier 2 Groundwater Contaminant Transport Model

$$C(x) = C_s \exp\left(\frac{x}{2\alpha_x} \left[1 - \sqrt{1 + \frac{4\lambda\alpha_x}{u}}\right]\right) \operatorname{erf}\left(\frac{aS_w}{4\sqrt{\alpha_y x}}\right) \operatorname{erf}\left(\frac{S_d}{4\sqrt{\alpha_z x}}\right)$$

$$C(x) = C_s \exp\left(\frac{x_m}{2\alpha_x} \left[1 - \sqrt{1 + \frac{4\lambda\alpha_x}{u}}\right]\right) \operatorname{erf}\left(\frac{aS_w}{4\sqrt{\alpha_y x_m}}\right) \operatorname{erf}\left(\frac{S_d}{4\sqrt{\alpha_z x_m}}\right) \quad (1)$$

Where $x_m = ax + bx^c$ (2)

The value of X_m is computed from equation (2), where the values for a, b and c in equation (2) are given in Table 1.

Table 1. Parameter values for equation (2)

<u>Chemical</u>	<u>a</u>	<u>b</u>	<u>c</u>
<u>Benzene</u>	<u>1</u>	<u>0.000000227987</u>	<u>3.929438689</u>
<u>Toluene</u>	<u>1</u>	<u>0.000030701</u>	<u>3.133842393</u>
<u>Ethylbenzene</u>	<u>1</u>	<u>0.0001</u>	<u>2.8</u>
<u>Xylenes</u>	<u>1</u>	<u>0.0</u>	<u>0.0</u>
<u>TEH-Diesel</u>	<u>1</u>	<u>0.000000565</u>	<u>3.625804634</u>
<u>TEH-Waste Oil</u>	<u>1</u>	<u>0.000000565</u>	<u>3.625804634</u>
<u>Naphthalene</u>	<u>1</u>	<u>0</u>	<u>0</u>

Variable definitions

x: distance in the x direction downgradient from the source

erf(): the error function

C(x): chemical concentration in groundwater at x

Cs: Source concentration in groundwater (groundwater concentration at x=0)

Sw: width of the source (perpendicular to x)

Sd: vertical thickness of the source

u: groundwater velocity (pore water velocity); $u=Ki/\theta_e$

K: hydraulic conductivity

i: groundwater head gradient

θ_e : effective porosity

λ : first order decay coefficient, chemical specific

$\alpha_x, \alpha_y, \alpha_z$: dispersivities in the x, y and z directions, respectively

For the following lists of parameters, one of three is required: site-specific measurements, defaults or the option of either (which means the default may be used or replaced with a site-specific measurement).

Soil parameters

Parameter		Default Value	Required
ρ_s	soil bulk density	1.86 g/cm ³	option
f_{oc}	fraction organic carbon in the soil	0.01 kg-C/kg-soil	option
θ_T	total soil porosity	0.3 cm ³ -voids/cm ³ -soil	option
θ_{as}	volumetric air content in vadose zone	0.2 cm ³ -air/cm ³ -soil	default
θ_{ws}	volumetric water content in vadose zone	0.1 cm ³ -H ₂ O/cm ³ -soil	default
θ_{acrack}	volumetric air content in foundation/wall cracks	0.2 cm ³ -air/cm ³ -soil	default
θ_{wcrack}	volumetric water content in foundation/wall cracks	0.1 cm ³ -H ₂ O/cm ³ -soil	default
I	infiltration rate of water through soil	7 cm/year	default

If the total porosity is measured, assume 1/3 is air filled and 2/3 is water filled for determining the water and air fraction in the vadose zone soil and floor cracks.

Groundwater Transport Modeling Parameters

Parameter		Default Value	Required
K	hydraulic conductivity	16060 cm/year	site-specific
i	groundwater head gradient	0.01 cm/cm	site-specific
S_w	width of the source	use procedure specified in 135.10(2)	site-specific
S_d	vertical thickness of the source	3 m	default
α_x	dispersivity in the x direction	0.1x	default
α_y	dispersivity in the y direction	0.33 α_x	default
α_z	dispersivity in the z direction	0.05 α_x	default
θ_e	effective porosity	0.1	default

where $u = Ki/\theta_e$

Groundwater Transport Modeling Parameters (continued)

First-order Decay Coefficients

Chemical	Default Value $\lambda(d^{-1})$	Required
Benzene	0.0005 0.000127441	default
Toluene	0.0007 0.0000208066	default
Ethylbenzene	0.00013 0.0	default
Xylenes	0.0005	default
Naphthalene	0.00013	default
Benzo(a)pyrene-TEH-Diesel	0.0000554955	default
Benz(a)anthracene-TEH-Waste Oil	0.0000554955	default
Chrysene	0	default

Other Parameters for Groundwater Vapor to Enclosed Space

Parameter		Default Value	Required
L _{gw}	depth to groundwater from the enclosed space foundation	1 cm	option
LB	enclosed space volume/infiltration area ratio	200 cm	option
ER (s-1)	enclosed space air exchange rate	0.00014	default
L _{crack}	enclosed space foundation or wall thickness	15 cm	default
\square	areal fraction of cracks in foundation/wall	0.01	default

Other Parameters for Soil Vapor to Enclosed Space

Parameter		Default Value	Required
L _s	depth to subsurface soil sources from the enclosed space foundation	1 cm	option
LB	enclosed space volume/infiltration area ratio	250 cm *	option
ER (s-1)	enclosed space air exchange rate	0.000185 *	default
L _{crack}	enclosed space foundation or wall thickness	15 cm	default
\square	areal fraction of cracks in foundation/wall	0.01	default

*These values are an average of residential and nonresidential factors.

Soil Leaching to Groundwater

Parameter		Default Value	Required
\square	groundwater mixing zone	2 m	default

Building Parameters for Iowa Tier 2

Parameter		Residential	Nonresidential
ER (s-1)	enclosed space air exchange rate	0.00014	0.00023
LB	enclosed space volume/infiltration area ratio	200 cm	300 cm

Other Parameters

For Tier 2, the following are the same as Tier 1 values (refer to Appendix A): chemical-specific parameters, slope factors and reference doses, and exposure factors (except for those listed below).

Exposure Factors for Tier 2 Groundwater Vapor to Enclosed Space Modeling:

Potential Residential: use residential exposure and residential building parameters.

Potential Nonresidential: use nonresidential exposure and nonresidential building parameters.